



# Postpartum Psychiatric Morbidity in Black and Hispanic/Latina Women in Association with Racial Discrimination

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Postpartum Psychiatric Morbidity in Black and Hispanic/Latina Women in Association with  
Racial Discrimination

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A Thesis in the Field of Biology  
for the Degree of Master of Liberal Arts in Extension Studies

Harvard University

March 2024



## Abstract

Childbirth is often seen as a positive event that may overshadow negative mental health symptoms among new mothers. Maternal psychopathology is a key contributor of maternal death. It is well-documented that Black and Hispanic/Latina women have an increased risk for maternal physical morbidity in the context of life-threatening childbirth experiences. There is a critical gap in the literature of the impact of racial and ethnic status and racial discrimination on maternal mental illness after childbirth. A cross-sectional study design was used to examine the prevalence and severity of maternal psychopathology among minority (i.e., Black and Hispanic/Latina) and non-Hispanic White women ( $N = 4,425$ ) who were 6-months postpartum. Additionally, in a subsample within 3-months postpartum ( $N = 28$ ) we assessed the role of perceived discrimination (lifetime and in peripartum care) on negative maternal mental health outcomes. Odds Ratios (OR) revealed minority postpartum women were two times more likely to have depression (OR = 1.80, 95% CI: 1.30, 2.50) and anxiety (OR = 1.80, 95% CI: 1.23, 2.53), than non-Hispanic White women. Furthermore, minority women had higher odds of experiencing symptoms of clinical childbirth-related post-traumatic stress disorder (CB-PTSD; OR = 1.60, 95% CI: 1.12, 2.14). By controlling for known risk factors of maternal mental illness, including obstetric complications and demographic features, the pattern of results remained significant. Minority women experienced higher rates of perceived and peripartum discrimination, most significantly associated with subsequent levels of CB-PTSD. These results call for eliminating racial and ethnic inequities in maternal mental health, ensuring appropriate mental health resources are available for those most in need.

## Acknowledgments

First and foremost, I would like to thank my mentor Dr. Sharon Dekel, assistant professor of Psychology of Harvard Medical School, for directing this thesis project. Her invaluable advice, patience, and knowledge encouraged me to become a better writer and researcher. I would also like to express my gratitude to Gabriella Hamlett, a PhD student in Harvard University's Clinical Science Program, for her continuous support and guidance throughout this project. Finally, I would like to thank my parents for their unwavering encouragement the past few years. Without their support, this would not be possible.

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## Chapter I.

### Introduction

Childbirth is often seen as a positive event, however; antepartum and postpartum are vulnerable periods in which a psychiatric disorder such as depression and anxiety can develop (Meltzer-Brody et al., 2018). Approximately, 9 to 17% of birthing women will experience postpartum depression and the rate is likely to be even higher due to lack of reported incidences (Robertson et al., 2004; Simhi et al., 2019; Yelland et al., 2010). While much of the literature on maternal mental health has focused on postpartum depression and anxiety, other conditions such as childbirth-related post-traumatic stress disorder (CB-PTSD) is seen in 6% of postpartum women (Dekel et al., 2020). Birthing mothers may face challenges that can increase the risk for maternal mental illness such as lack of sleep, mental and physical stress, labor and delivery complications, and poor quality of patient care (Dunkel Schetter & Tanner, 2012; Oladapo et al., 2015). Maternal mental illness following childbirth is the leading contributor of maternal death (Oates, 2003).

Women with perinatal mental illness are at increased risk for adverse obstetric events following childbirth (Adane et al., 2021). Nearly 50% of postpartum mental illnesses occur from untreated or undetected perinatal psychopathology (Aktar et al., 2019; Vesga-López et al., 2008). Left undiagnosed, perinatal mental illness can contribute to various adverse birth outcomes, including the risk of preterm delivery, low infant birthweight, infant mortality, and impaired mother-infant attachment (Grigoriadis

et al., 2019; Meltzer-Brody et al., 2018; Pawluski et al., 2017). Furthermore, women with any perinatal mental illness are at risk for shorter gestational periods (<39 weeks), thereby increasing the risk of birth complications (Männistö et al., 2016). At its most severe, maternal mental illness can result in maternal death, with suicide accounting for approximately 20% of postpartum deaths (Grigoriadis et al., 2017; Lindahl et al., 2005).

The recommended timeframe for a postpartum follow-up appointment with a doctor is within 3 weeks after giving birth, followed by a comprehensive exam by 12 weeks (McKinney et al., 2018; Paladine et al., 2019). The frequency of postpartum follow-up care may be adjusted on a case-by-case basis, particularly for mothers who experienced additional childbirth or postpartum complications (McKinney et al., 2018; Paladine et al., 2019). On average, maternal mortality most often occurs by 42 days postpartum and can be due to any number of health-related complications (Blenning & Paladine, 2005; Zaharatos et al., 2018). Conversely, maternal suicide often occurs between 9 and 12 months postpartum (Grigoriadis et al., 2017). While the recommended postpartum care may be suitable to monitor acute health complications after childbirth, it may not be sufficient for monitoring adverse mental health symptoms during the first postpartum year (Meltzer-Brody et al., 2018).

Race and ethnicity are important predictors of severe physical morbidity during pregnancy and childbirth (Creanga et al., 2014). Extensive documentation shows that Black and Hispanic/Latina mothers have a heightened risk of pregnancy-related health complications such as hypertensive disorders, postpartum hemorrhage, and gestational diabetes, compared to non-Hispanic White mothers (Cabacungan et al., 2012; Bornstein et al., 2020; Tucker et al., 2007). Remarkably, even when adjusting for prior health

complications, minority women have higher rates of cesarean deliveries (Okwandu et al., 2022). This is extremely consequential because cesarean deliveries increase the chance of further physical morbidity and experiences of near death (American College of Obstetricians and Gynecologists [ACOG], 2019). Moreover, Black and Hispanic/Latina women are more likely to have negative birth outcomes such as preterm birth, low infant birthweight, and infant death within the first year of life (Osterman, 2022). Due to the increased risk of physical morbidity, the possibility of maternal death increases by 2 to 3-fold for minority women compared to non-Hispanic White women (Boyd et al., 2020; Harper et al., 2004; Wang et al., 2021). The disproportionately high maternal and infant physical morbidity rates among minority women can have long-term implications on a mother's physical and mental health (Aktar et al., 2019; Howell et al., 2018).

Racial discrimination is known to have adverse implications on mental health and can severely impact life satisfaction and longevity (Hackett et al., 2020). Evidence regarding ethnic status as well as racial and ethnic discrimination in association with maternal mental health is limited (Njoroge et al., 2022; Segre et al., 2021; Weeks et al., 2022). One of the reasons is because maternal mental health studies have relied on samples of non-Hispanic White women and rarely include or have low participation rates from racially and ethnically minoritized communities.

Over the last decade, there has been a rise in cases of maternal mental illness and even larger increase during the COVID-19 pandemic due to racial discrimination in the medical setting (Njoroge et al., 2022). Our understanding of racial and ethnic discrimination on the impact of maternal mental illness is not clear and is deserving of attention. The purpose of the proposed study is to understand the relationship of race and

ethnicity, racial discrimination, and maternal psychopathology. We aim to contribute to the literature and bring awareness to risk factors for maternal psychopathology among women from underrepresented minority groups. We hope our findings will guide efforts to eliminate racial and ethnic disparities across the peripartum and improve mental health outcomes.

Specific aims of the study are (1) to examine the prevalence and severity of postpartum depression, anxiety, and childbirth-related PTSD (CB-PTSD) in Black and Hispanic/Latina women and compare it to rates among non-Hispanic White women, considering potential differences in birth outcomes, demographic features, and trauma history; (2) examine whether perceived racial discrimination (lifetime and in peripartum care) is associated with race and ethnicity; (3) examine whether racial discrimination predicts maternal postpartum psychopathology.

#### Definition of Terms

Anxiety: Generalized Anxiety Disorder is described as, “Excessive anxiety and worry (apprehension expectation), occurring more days than not for at least 6 months, about a number of events or activities (such as work or school performance)” (American Psychiatric Association [APA], 2022). For the context of this paper, it will be referred to with either peripartum or postpartum onset. See DSM-5 TR criteria for the complete list of symptoms.

Depression: Major Depressive Disorder effects the way an individual behaves, thinks, and functions and is usually accompanied with feelings of hopelessness and disinterest in normal activities (APA, 2022). For the context of this paper, it will be referred to with

either peripartum or postpartum onset. See DSM-5 TR criteria for the complete list of symptoms.

Maternal mental illness/disorder: a psychiatric disorder developed before or after childbirth and lasting more than two weeks.

Perinatal/anteartum: before childbirth.

Peripartum: the period of time occurring before, during, and after childbirth.

Postpartum: following childbirth.

Childbirth-related post-traumatic stress disorder (CB-PTSD): a psychiatric disorder which occurs following a traumatic event. CB-PTSD refers to trauma associated with the childbirth experience which may results in PTSD symptoms. Symptoms may include: “Recurrent, involuntary, and intrusive distressing memories of the traumatic event(s) or dissociative reactions (e.g., flashbacks) in which the individual feels or acts as if the traumatic event(s) were recurring” (APA, 2022). See DSM-5 TR criteria for the complete list of symptoms.

Psychopathology: the study of mental illness.

Racial discrimination: unfavorable treatment towards any individual based on their skin color, race, or ethnic origin.

## Background of the Problem

In the United States, differences in health outcomes vary between racial and ethnic groups and these disparities are noted in some of the earliest medical records (Williams & Sternthal, 2010). Today, racial and ethnic health disparities continue to be a

critical issue, impacting the overall health and safety of minoritized communities.

Minority groups have a two-fold higher risk of developing a chronic disease such as type 2 diabetes, hypertension, or cancer compared to non-Hispanic White populations (Price et al., 2013; Quiñones et al., 2011). Adverse health consequences among minority groups are often attributed to socioeconomic status and access to healthcare (Institute of Medicine, 2003; Williams et al., 2010). Unfortunately, Black and Hispanic/Latina/o populations experience worse lifetime health outcomes such as early onset of disease, increased severity of disease, and poorer likelihood of survival compared to non-Hispanic White populations (Hill et al., 2023; Williams & Sternthal, 2010).

Despite improvements in life expectancy for minority groups since the 1900s (Norheim et al., 2015; Shiels et al., 2017), race and ethnicity are directly linked to overall health outcomes and should not be overlooked in research and healthcare. In 1993, the National Institutes of Health (NIH) mandated the inclusion of both women and minority groups into clinical research (Chen et al. 2014). Previously, the majority of clinical research focused on non-Hispanic White male populations (Peters et al., 2016). Unfortunately, the history of medical experimentation and unconventional treatment of minority groups (Washington, 2006) may contribute to the low recruitment rates of minorities into clinical trials. Today, Black and Hispanic/Latina/o communities comprise only 6% of participants in biomedical clinical trials in the U.S. (Oh et al., 2015). Recruiting minority populations into healthcare research continues to be a challenge.

In 2002, The Institute of Medicine (IOM) released a report titled, “Unequal Treatment” that drew the attention of the United States Congress (Fiscella & Sanders, 2016). The report outlined racial and ethnic disparities present in health institutions and



the implications the disparities have on patient care. The IOM report provided potential solutions for this problem including cross-cultural education for all healthcare providers and hiring and recruiting more minoritized individuals into the healthcare workforce (Betancourt & Maina, 2004). As a result of the report's recommendations, Congress required annual reports of racial and ethnic healthcare disparities in the U.S. However, despite this effort, disparities persist.

Prior to 2010, Black and Hispanic/Latina/o individuals were at the highest risk of being uninsured until the Affordable Care Act (ACA) in the U.S. was enacted (Artiga et al., 2022). Racial and ethnic disparities in healthcare, in part, are due to accessibility and initiation of care (Cook et al., 2014). Access to healthcare can be an obstacle especially if individuals live in poverty or are uninsured (Ashton et al., 2003; Manuel, 2018). On average, Black and Hispanic/Latina/o populations are more likely to be impoverished and have limited access to health insurance. The ACA eliminated discrimination against race and ethnicity, gender, or preexisting health conditions for applicants applying for insurance (Artiga et al., 2022). The expansion of Medicaid in some states significantly increased access and affordability of healthcare particularly for minority communities. In 2017, there was an increase in uninsurance rates for minority communities until Medicaid coverage was expanded in 2020 during the COVID-19 pandemic (Artiga et al., 2022).

The life expectancy gap between minoritized populations and non-Hispanic White populations has significantly decreased, from a gap of 5.9 years in 1999 to 3.6 years in 2013 (Kochanek et al., 2015). The increase in life expectancy among minority groups is largely due to advances in research, public health initiatives, and a decrease in the rate of chronic disease (Kochanek et al., 2015; Shiels et al., 2017). Although life expectancy

rates for minorities have increased, it remains high for any one group. As of 2015, Black and Hispanic/Latina women were the highest of any population to suffer from midlife mortality (Woolf et al., 2018). The increase in midlife mortality rates for minoritized groups, particularly women, are not only from chronic disease but substantial increases of drug overdoses, alcohol poisoning, behavior disorders, and suicide (Shiels et al., 2017; Woolf et al., 2018). One in five people will experience a common mental disorder in their lifetime, which warrants attention to be brought to both mental and physical health disorders (Steel et al., 2014).

When the COVID-19 pandemic emerged in 2020, it brought to the forefront a glaring issue: Black and Hispanic/Latina/o populations in the U.S. had a disproportionate level of infection and death compared to non-Hispanic White populations (Hill & Artiga, 2022). This concerning trend persisted among these minority groups when the Delta and Omicron variants emerged. Not only did these minority groups have greater severity of infection from COVID-19, but they were also particularly vulnerable to psychiatric disorders (Nguyen et al., 2022). During that time, depression and anxiety symptoms were highest among minorities, and in the general population, women were affected the most (Dal Santo et al., 2022; Nguyen et al., 2022; Sun et al., 2023). Despite efforts from congress and public health officials to eliminate racial and ethnic health disparities, a health crisis such as COVID-19 has made it evident that these disparities continue to be a critical issue. The COVID-19 pandemic served a stark reminder that addressing racial and ethnic disparities in healthcare should be an ongoing priority.

## Women's Mental Health

In the United States, the prevalence rates of lifetime depression and anxiety are two to three times higher in women than men (Kessler et al., 2005; Steel et al., 2014). Throughout history, a significant portion of medical research was conducted on men which has been thought to contribute to health disparities among women (Peters et al., 2016). Risk factors that often contribute to the gender gap in mental health are domestic and physical abuse, gender role expectations, poverty, and workplace discrimination (Klonoff et al., 2000; Platt et al., 2016; Riecher-Rössler, 2017). These factors put women at a disproportionate risk of developing a mental illness. Unfortunately, the COVID-19 pandemic exacerbated these disparities with women experiencing the worst mental health outcomes from the COVID-19 pandemic among any gender group (Dal Santo et al., 2022; Sun et al., 2023).

Sex differences in mental health outcomes may be explained, in part, by the differential stress experiences encountered by women. Women tend to experience heightened stress levels and a greater susceptibility to stress than men (Goldstein et al., 2010; Sandanger et al., 2004). Experiencing or reexperiencing stressful events put women at a two-fold higher risk than men for developing trauma disorders such as post-traumatic stress disorder (PTSD; Breslau, 2002; Tolin & Foa, 2006). Various theories have been proposed to explain gender differences in mental health disorders. These theories include genetic variations (Kendler et al., 1995), sex hormones (Bangasser & Valentino, 2014), and socioeconomic status (O'Neill et al., 2020). It's worth noting, psychiatric disorders are often comorbid with other chronic diseases which may indicate other pathologic

factors at play (Bahorik et al., 2017; Danna et al., 2016; Nakash et al. 2014; Simon et al., 2006).

### Mental Health in Motherhood

Motherhood is commonly perceived as a positive experience; however perinatal and postpartum mental health disorders can be extremely debilitating, affecting up to 20% of birthing women (Fisher et al., 2012). At their most severe, these conditions are the leading cause of maternal death (Oates, 2003). Approximately, 52% of women in the U.S. between the ages of 18-54 have reported experiencing a mental illness (Center for Behavioral Health Statistics and Quality, 2018). This evidence is concerning since women with any perinatal mental illness are at risk for shorter gestational periods (<39 weeks) increasing the risk of birth complications (Männistö et al., 2016). The rate of women who experience a mental illness in their lifetime is increasing, and if left untreated during pregnancy, it can contribute to a higher risk of maternal physical morbidity and mortality (American College of Obstetricians and Gynecologists [ACOG] & Society for Maternal-Fetal Medicine [SMFM], 2016).

The first year after childbirth is a vulnerable time for the mother, with many challenges accompanying the arrival of a new baby and transitioning to parenthood (Aktar et al., 2019; Howard et al., 2014). The first two months following childbirth is the most likely time for a postpartum mental illness to develop (Etebary et al., 2010). It is imperative for mothers, their families, and their health providers to be cognizant of the mother's mental state in the postpartum period. Maternal mental health disorders can have negative lifetime consequences on the mother and can lead to impaired child

development, mother-infant bonding, and breastfeeding behaviors (Aktar et al., 2019; Bauer et al., 2016; Schumacher et al., 2008). Additionally, mothers experiencing postpartum depression are less likely to adhere to recommended feeding, safety, and developmental practices with their children (Balbierz et al., 2015). Consequently, family dynamics can be negatively impacted by a mother's mental state and lead to increased parental stress (Johansson et al., 2020). Prioritizing maternal mental health is essential for the well-being of the mother, her baby, and building a healthy family dynamic.

### Current Research and Risk Factors for Maternal Psychopathology

Non-communicable diseases (NCDs) account for the predominant cause of death among women (Peters et al., 2016). A diverse range of health conditions fall under the category of NCDs, including cardiovascular diseases, metabolic disorders, psychiatric disorders, respiratory diseases, and cancers. Interestingly, women on average live longer than men but have higher rates of multimorbidity (Barford et al., 2006; Baum et al., 2021). During pregnancy and childbirth, women who had at least one health comorbidity were five times more likely to experience severe maternal morbidity (SMM; Brown et al., 2020). Severe maternal morbidity (SMM) refers to adverse labor and delivery outcomes that have unintended health consequences on the mother (ACOG & SMFM, 2016). According to ACOG and SMFM (2016), a woman who experiences SMM is nearly escaping death.

Of all NCDs, psychiatric disorders are the leading cause of maternal death with maternal suicide accounting for 20% of postpartum deaths (Grigoriadis et al., 2017; Hoyert, 2023; Lindahl et al, 2005). Maternal death rates from 2019 were 20.1 deaths per

100,000 live births compared to 2021 with 32.9 deaths per 100,000 live births (Hoyert, 2023). Amid the COVID-19 pandemic, there was a 33% increase in maternal deaths (Thoma & Declercq, 2022; Woolf et al., 2021). These mortality rates were most pronounced among Hispanic/Latina and Black communities. The exact cause of the increase in maternal mortality, whether related to the COVID-19 infection or preexisting health conditions, remains uncertain. To this end, since it is known that maternal psychopathology is a leading contributor of maternal death, furthering research on maternal mental illness is crucial in the pursuit to improve health outcomes of mothers and their infants.

The prevalence of maternal mental illness has increased over the past decade, yet still receives insufficient research attention (ACOG & SMFM, 2016; Hoyert, 2023). Approximately, 15-20% of mothers will experience either depression and/or anxiety in the perinatal or postpartum periods and CB-PTSD is seen in nearly 6% of women (Dekel et al., 2020; Fisher et al., 2012). Postpartum depression and anxiety have been widely studied but maternal psychiatric disorders beyond that are still being explored and long-term implications are relatively unknown. Nearly 50% of postpartum mental illnesses occur from untreated or undetected perinatal psychopathology, which pose significant threats to the well-being of mothers and their infants (Aktar et al., 2019; Vesga-López et al., 2008). To our knowledge, research on maternal mental illness in association with infant mortality is extremely limited. One study found a moderate association between maternal mental illness and the risk of stillbirth and infant mortality (Adane et al., 2021). Several risk factors have been identified as contributors of postpartum mental health disorders, including maternal age, marital status, socioeconomic status, trauma history,

mode of childbirth delivery, and Neonatal Intensive Care Unit (NICU) admission (Barr & Marugg, 2019; C. Beck, 2001; D. Beck et al., 2022; Chan et al., 2020; Cleary-Goldman et al., 2005; Cook et al., 2018; Dekel et al., 2019; Goyal et al., 2010; Rogal et al., 2007).

### Maternal Age

As a woman ages, so does her risk of childbirth complications especially over the age of 35 (Cleary-Goldman et al., 2005; Kenny et al., 2013). The risk of preeclampsia, preterm birth, stillbirth, placental abruption, and cesarean delivery increases substantially (Bayrampour & Heaman, 2010; Cleary-Goldman et al., 2005; Kenny et al., 2013). Among these risk factors, the likelihood of developing postpartum depression and experiencing psychological distress increases with age as well (Aasheim et al., 2012; Muraca & Joseph, 2014).

### Marital Status

Improved pregnancy and childbirth outcomes have long been associated with marital status (Barr & Marugg, 2019). Studies have found that the quality of a woman's relationships can potentially predict postpartum depression outcomes (Akincigil et al., 2010; Horwitz et al., 2007). A support system, especially in the marital context can function as a protective factor from preventing adverse birth outcomes (Zhang et al., 2023).

### Socioeconomic Status

Socioeconomic status is a strong predictor of mental and physical health outcomes, especially among pregnant and postpartum women (Beck, 2001; Goyal et al.,

2010; Kahn et al., 2000). Research has consistently shown that women with lower economic status have an elevated risk of developing postpartum depression and anxiety, consequently increasing the risk of adverse birth outcomes (Beck, 2001; Goyal et al., 2010; Horwitz et al., 2007). While the majority of these studies have focused on postpartum depression in relation to socioeconomic status, it is equally imperative to identify how other maternal mental health disorders may be influenced.

### Trauma History

Prior trauma history and perinatal trauma are risk factors for developing postpartum PTSD and can have a profound negative impact on mother-infant bonding (Chan et al., 2020; Cook et al., 2018; Rogal et al., 2007). Women are disproportionately exposed to trauma, and unfortunately is a common occurrence during reproductive years (Cokkinides et al., 1999; Gazmararian et al., 2000). To our knowledge, only very few studies address lifetime consequences of trauma exposure across the peripartum and its influence on mental health outcomes (Dailey et al., 2011; Lehrner & Yehuda, 2018). Trauma is a complex area of research that merits further exploration to understand how to effectively treat trauma disorders among birthing mothers.

### Mode of Childbirth Delivery

Mode of childbirth delivery is associated with worse mental health outcomes (Dekel et al., 2019). At 6 months postpartum, women who had emergency cesarean births were more likely to exhibit symptoms of anxiety, depression, and stress compared to women who had vaginal deliveries (Skov et al., 2022). The screening process for postpartum mental illness currently does not take into account delivery mode.



## NICU Admission

Along with the aforementioned risk factors, the rates of NICU admission are approximately 1 in 10 in the U.S. (Harrison et al., 2018; Liu et al., 2016). The duration of an infant's stay in the NICU and the emotional distress experienced by mother can have a severe negative impact on a mother's postpartum mental health and the mother-infant bond (Grunberg et al., 2019). A multi-year study found that postpartum women had higher odds of a depression and/or anxiety diagnosis within a year of childbirth if the infant was admitted to the NICU compared to those who did not (Beck et al., 2022).

## Severe Maternal Morbidity Among Minority Women

Health inequities for women have improved in the last century; however, it wasn't until 1993 when the NIH mandated that both women and minority groups be implemented into clinical research (Chen et al. 2014). Unfortunately, within obstetrics and gynecology, certain practices were founded by use of Black women's bodies for unconventional and harmful experimentation (Deirdre, 2018; Washington, 2006). The history of medical experimentation on minority groups may contribute to the low recruitment rates of minorities into clinical trials. At present, recruiting minority populations continues to be a challenge, given that Black and Hispanic/Latina/o communities comprise only 6% of participants in biomedical clinical trials in the U.S. (Oh et al., 2015). The efforts of the NIH have minimally improved racial and ethnic health disparities. Minority women continue to suffer the most severe health consequences (Chinn et al., 2021).

It is well documented that women consistently have worse health outcomes over their lifespan and Black women have higher all-cause morbidity and mortality rates than any racial or ethnic group (Centers for Disease Control and Prevention [CDC], 2017). In the U.S., SMM affects 50,000 birthing women each year, with the highest impact observed among minority women (Callaghan et al., 2012; CDC, 2017). Population-based studies have shown the highest rates of SMM among Black women (4.2%), followed by Hispanic/Latina women (2.7%), and lastly, non-Hispanic White women (1.5%; Howell et al., 2016; Howell et al., 2017). Black and Hispanic/Latina mothers are considered high risk for SMM which increases the possibility of maternal death by 2 to 3-fold compared to non-Hispanic White mothers (Boyd et al., 2020; Harper et al., 2004; Wang et al., 2021). The significantly high SMM rates among minority women, particularly Black women, can have long-term implications on a mother's physical and mental health (Aktar et al., 2019; Howell et al., 2018).

Minority women experience much higher rates of health comorbidities than non-Hispanic White women, which increases the likelihood of pregnancy complications across the peripartum (Brown et al., 2020; Grobman et al., 2015; Howell et al., 2017; Lister et al. 2019, Tucker et al., 2007). Pregnancy-related health complications such as hypertensive disorders, postpartum hemorrhage, and gestational diabetes are more prevalent among Black and Hispanic/Latina mothers than non-Hispanic White mothers (Bornstein et al. 2020; Cabacungan et al., 2012; Tucker et al., 2007). In addition to chronic health conditions, minority women are more likely to have cesarean deliveries whether or not they've had a prior health complication (Okwandu et al., 2022). It is

important to highlight that cesarean deliveries increase the chance of further physical morbidity and experiences of near death (ACOG, 2019).

The staggeringly high risk of maternal mortality among minority women cannot be fully explained by reproductive health or sociodemographic features; it is a multifaceted issue (Harper et al., 2004; Howell, 2018). Data by Berg et al. (2004), revealed that the percentage of potentially preventable deaths up to one year postpartum was 46% for Black women and 33% for non-Hispanic White women. The need for improved obstetric care for minority women is apparent and has been consistently shown mitigate the risks of maternal morbidity and mortality (Berg et al., 2004; Lawton et al., 2014). Global initiatives have been implemented to improve maternal morbidity and mortality; unfortunately, the U.S. continues to fall far behind other developed countries (GBD 2015 Maternal Mortality Collaborators, 2016; Tikkanen et al., 2020).

#### Adverse Birth Outcomes Among Minority Women: U.S. National Statistics

Racial and ethnic disparities in birth outcomes continue to be a health crisis for minority women with little improvement over the last decade in the U.S. (ACOG & SMFM, 2016). These disparities are reflected in Infant Mortality Rates (IMR) which gauge a countries welfare and socioeconomic development (Gonzalez & Gilleskie, 2017). In 2019, the U.S. recorded an infant death rate of 5.58 deaths per 1,000 live births, a slight decline from 2018, but still trails far behind other developed countries (Ely & Driscoll, 2021). Among these infant deaths in 2019, Black women experienced the highest rate with 10.6 deaths per 1,000 live births. Hispanic women ranked fourth with 5 infant deaths for every 1,000 live births. The top 5 causes of infant mortality were (1)

birth defects; (2) both preterm birth and low birthweight; (3) sudden infant death syndrome (SIDS); (4) injuries; (5) maternal pregnancy complications.

Race and ethnicity are important predictors of birth outcomes in women (Creanga et al., 2014). The most significant contributors of infant mortality are preterm birth and low birthweight (Ely & Driscoll, 2021). Minority women, in particular Black women, are more likely to experience preterm birth, low birthweight, and infant death within the first year of life compared to non-Hispanic White women (Osterman et al., 2022). In the U.S., prevalence of preterm birth in 2019 was 14.39% in Black mothers and 9.97% in Hispanic mothers and 9.26% in White mothers (Osterman et al., 2022). Additionally, low birthweight rates in 2019 were 14.15% for Black mothers, 7.55% for Hispanic mothers, and 6.89% for White mothers. The disparity in birth outcomes is complex and is not entirely attributed to race and ethnicity. Various factors contribute to adverse birth outcomes, including sociodemographic features, access to care, quality of obstetric care, and preexisting health conditions, (Crear-Perry et al., 2021).

### Maternal Mental Health Among Minority Women

Evidence suggests that Black and Hispanic/Latina are more likely to experience perinatal depression and stressful life events prior to giving birth than non-Hispanic White women (Benatar et al., 2020; Burns et al., 2015; Gavin et al., 2011; Mukherjee et al., 2016; Shen et al., 2010). Depression during pregnancy can have a significant impact on a mother's overall health and lead to postpartum depression or other co-occurring psychiatric disorders (Burt & Stein, 2002; Zuckerman et al., 1989). Interestingly, many studies investigating maternal mental illness overlook the role of race and/or ethnicity.

Notably, the prevalence of postpartum depression among Black and Hispanic/Latina women is 43.9% and 46.8% respectively, compared to 31.3% of non-Hispanic White women (Howell et al., 2005). Recognizing the influence of race and ethnicity as a potential contributor of maternal psychopathology (Docherty et al., 2022) is critical for improving the lives of mothers and enhancing mental health screening protocols for minority women.

Several studies have demonstrated the impact of known risk factors for maternal psychopathology on mental health outcomes among minority women. A study of Black and Hispanic mothers revealed comparable positive Edinburgh Postnatal Depression Scale (EPDS) screenings in Black (24.04%) and Hispanic (18.75%) mothers (Doe et al., 2017). The mode of delivery differentially predicted a positive EPDS score. That is, when delivered vaginally, the score was lower than when delivered by cesarean. Minority women tend to experience elevated levels of lifetime trauma, interpersonal trauma, and violence (Roberts et al., 2011). Since minority women are disproportionately burdened by trauma, their risk of PTSD substantially increases, particularly during pregnancy and after childbirth (Thomas et al., 2021). Moreover, when compared to non-Hispanic White mothers, Black and Hispanic/Latina women both displayed severe postpartum symptoms associated with PTSD (measured on the dysphoric arousal model; Thomas et al., 2021).

The rate of women receiving mental health support or counseling during the perinatal and postpartum periods are low and access to mental health services remain even lower for minority women (Declercq et al., 2022). A study of low-income birthing women found that only 4% of Black women and 5% of Hispanic/Latina women initiate postpartum depression treatment compared to 9% of non-Hispanic White women

(Kozhimannil et al., 2011). The rate of continued follow up care initiated by the minority women were much lower than non-Hispanic White women. Limited availability of both physical and mental health education in minority communities could be the cause of low treatment initiation and continuation rates (Howell et al., 2012). Expanding maternal mental health research and education may be a protective factor for some mothers.

### Racial Discrimination and Maternal Mental Health Outcomes

Increasing evidence suggests maternal psychopathology among minority women may not be because of race and/or ethnicity but rather experiences of racial discrimination (Kozhimannil & Westby, 2019; Slaughter-Acey et al., 2013). Among the few studies that have examined this, women of color who experienced racial discrimination were two to three times more likely to experience perinatal or postpartum depressive symptoms (Segre et al., 2021; Weeks et al., 2022). A study of Black birthing women amid the COVID-19 pandemic found that an increased risk of postpartum depression and anxiety was associated with more adverse COVID-19 experiences and higher levels of structural and interpersonal racism (Njoroge et al., 2022). Racial discrimination may play a role in the severe physical and mental morbidity outcomes observed among minority women. While there are very few studies examining this issue, there are even fewer studies that control for multiple races and/or ethnicities, demographic features, and socioeconomic factors.

To our knowledge, the impact of racial discrimination on adverse birth outcomes and child development is limited. Among the studies available, experiences of discrimination among Black and Hispanic/Latina mothers, coupled with subsequent

mental illness (i.e., depression and/or anxiety), are associated low infant birth weight (Earnshaw et al., 2013) and impaired socioemotional development in their children (Rosenthal et al., 2018; Zeiders et al., 2016). Since minority women are at increased risk for mental health disorders across the peripartum (Benatar et al., 2020; Burns et al., 2015; Gavin et al., 2011; Howell et al., 2005; Lucero et al., 2012; Mukherjee et al., 2016; Ramos-Marcuse et al., 2010; Shen et al., 2010), it would be important for future studies to examine how mothers are caring for their children after birth. One study linked racial discrimination to postpartum psychopathology, as well as harsher parenting techniques after childbirth (Bécares et al., 2015). The use of harsher parenting strategies resulted in impaired socioemotional development in their children. Research suggests racial discrimination may not only adversely impact maternal mental health but also the mother-infant bond.

Racism is defined by Paradies and colleagues (2015) as, “organized systems within societies that cause avoidable and unfair inequalities in power, resources, capacities and opportunities across racial or ethnic groups. Racism can manifest through beliefs, stereotypes, prejudices or discrimination.” Decades of research show that perceived racial discrimination is correlated to worse mental and physical health outcomes (Williams et al., 2003). Clark and colleagues (1999) created the biopsychosocial pathway of racism and its association with poor health. This pathway depicts the environmental stimuli that give rise to perceived racial discrimination and consequently decreased health outcomes. How someone copes with racial discrimination ultimately determines the health outcome.

Longitudinal studies assessing the relationship of racial discrimination on mental health reveals the degree of discrimination is consistent with depressive symptoms over time (Schulz et al., 2006). Chronic exposure to stressors such as racial discrimination causes exacerbated and prolonged psychiatric symptoms in Black and Hispanic/Latina/o individuals (Breslau et al., 2005; Clark et al., 1999; Schulz et al., 2006; Williams et al., 2003). Since racial discrimination has a significant role in the cause of illness in minoritized populations, it is deserving of attention in research. By doing so, efforts can better address racial disparities in healthcare and implement further strategies to improve adverse health outcomes.

It is well established that racial discrimination impacts mental health outcomes among the general population. However, it is critical to assess how minoritized mothers may be disproportionately affected. One study linked experiences of racial discrimination (categorized as a psychosocial stressor) among Black mothers to preterm birth and low birthweight in their infants (Mustillo et al., 2004). Severe maternal and infant morbidity and mortality has increased in the last decade and is at an all-time high after the COVID-19 pandemic (Admon et al., 2018; Grechukhina et al., 2020; Liu et al., 2022). Furthering research on maternal psychopathology would serve women far beyond its immediate impact. Moreover, it would not only improve the lives of mothers and infants but push to prioritize screening for mental illnesses during perinatal care.

### Research Aims, Goals, and Hypothesis

This study encompasses three main objectives. It aims to investigate the interplay between race and/or ethnicity, racial discrimination, and maternal postpartum



psychopathology. Secondly, it seeks to improve perinatal and postpartum mental health care for minoritized mothers. Lastly, it strives to expand existing literature in the hope that it contributes to efforts in improving birth outcomes and reduce the severe maternal morbidity and mortality rates in the U.S. By investigating these interconnected factors, we seek to gain a deeper understanding of how racial disparities and discrimination contribute to mental health challenges in maternal populations.

Specific aims of the study are (1) to examine the prevalence and severity of postpartum anxiety, depression, and CB-PTSD among minority women and compare it to rates among non-Hispanic White women, considering potential differences in birth outcomes, demographic features, and trauma history; (2) examine whether perceived experiences of discrimination (lifetime and in peripartum care) are associated with race and ethnicity; (3) examine whether racial discrimination predicts maternal postpartum psychopathology.

In this study we hypothesize (1) while controlling for known risk factors of maternal psychopathology, Black and Hispanic/Latina mothers will be more likely to experience clinical symptoms of postpartum depression and anxiety. Additionally, clinical levels of CB-PTSD will be more prevalent among the minority women compared to non-Hispanic White women; (2) Black and Hispanic/Latina mothers will exhibit heightened levels of lifetime and peripartum perceived discrimination, resulting in adverse mental health outcomes.

## Chapter II.

### Materials and Methods

In this chapter, we will discuss aspects of the study's methodology, participants, measures, ethical considerations, and statistical tests that were used to evaluate aims 1 and 2.

#### Study Design

A cross-sectional study design was used to investigate maternal mental health among Black and Hispanic/Latina women following childbirth. The study aimed to determine if racial and ethnic differences contribute to development of postpartum psychiatric morbidity.

#### Participants

Aim 1 of this study assessed two large-scale survey data sets of postpartum women. The first dataset examined childbirth experiences of 709 postpartum women. The sample included 64 Black and Hispanic/Latina women and 645 were non-Hispanic White women. The second dataset examined the effect of the COVID-19 pandemic on psychological outcomes of 3,716 postpartum women. The sample included 459 Black and Hispanic/Latina women and 3,257 non-Hispanic White women. The total sample comprised of 4,425 women. In the survey, women had the option to specify their affiliation with multiple races and/or ethnicities. Women who identified as three or more races and/or ethnicities were excluded from the study because we cannot determine the

participants' predominant race and/or ethnicity. Women in both studies gave birth within the last 6 months and were recruited via hospital announcements, social media, and professional organizations. Participants completed an anonymous survey which evaluated factors related to their recent childbirth and mental health status.

Aim 2 of this study examined a cohort of 28 postpartum women who completed a racial disparities survey as part of another ongoing study. The purpose of the survey was to evaluate the women's perceived experiences of lifetime and peripartum care discrimination. Secondly, questions related to their mental health history were collected. The sample included 5 Black and Hispanic/Latina women and 23 non-Hispanic White women. The women in this study gave birth within the last 3 months and were recruited via the MGH postpartum unit, public announcements, and remote outreach.

## Measures

The Brief Symptom Inventory (BSI; Derogatis, 1993) was used to measure general distress over the last week on a 5-point scale (0-4); specifically focused on the depression and anxiety subscales (measured in aim 1), and general distress (measured in aim 2). The BSI is a 53-item self-report questionnaire with 9 subscales (somatization, obsession compulsion, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism) (Derogatis, 1993). Postpartum samples have adequately used the BSI with good reliability (Örün et al., 2013; Ross et al., 2003). The depression and anxiety subscales have 6-items each and were given a cutoff score of 9 (Biggs et al., 2017). General distress was measured in aim

2 by a shortened version (18-item) of the BSI with 3 subscales (depression, anxiety, somatization).

To evaluate CB-PTSD, we utilized the 20-item post-traumatic checklist for DSM-5 (PCL-5; Weathers et al., 2013). Participants were instructed to report symptoms according to their recent childbirth over the last month on 5-point scale (0-4). A clinical cutoff score of 32 was used to determine a provisional PTSD diagnosis (Wortmann et al., 2016). The Life-Events Checklist (LEC) determined if participants had a history of exposure to traumatic events (Weathers et al., 2013). No formal cutoff score was used; we categorized participants into binary groups (yes trauma history or no trauma history).

The Peritraumatic Distress Inventory (PDI) assesses acute stress responses that occur due to childbirth (Brunet et al., 2001). The PDI includes 13 self-report items administered on a 5-point scale (0-4) that examines levels of distress that occur during and after the specified traumatic event. A cut off score of 17 indicates an increased risk of PTSD (Nishi et al., 2010).

Self-report measures were used to collect socio-demographic features (i.e., age, gender, race and ethnicity, and income level), mental health history, mode of childbirth delivery, history of childbirth complications, and NICU admission.

Aim 2 utilized the Perceived Discrimination Scale (PDS) which evaluates perceived experiences of discrimination based on several factors including but not limited to race and gender (Williams et al., 1997). For purposes of this study, a 9-item discrimination subscale was used to assess lifetime experiences of discrimination. Participants were asked to rate the frequency of discrimination on a scale of 1-4 (1=often,

4=never) and then total scores will be reversed. Higher scores indicate more experiences of discrimination. Three additional questions regarding Obstetric (OB) discrimination were asked to evaluate experiences of perinatal discrimination. For purposes of this study, the PDS scoring for lifetime discrimination was not reversed but the relationship remains the same. Lower scores will indicate more experiences of perceived discrimination.

The Edinburgh Postnatal Depression Scale (EPDS) was used in aim 2 to assess clinical levels of postpartum depression (Cox et al., 1987). The EPDS consists of 10-items in which the participant is asked to rate each question on a scale of 0-3. A cutoff score of 9-10 is considered probable depression and should be referred to a healthcare provider.

### Ethical Considerations

The research of interest was conducted based on data sets gathered by Dekel Lab located at Massachusetts General Hospital (MGH). Institutional Review Board (IRB) approval through Harvard University is not required since access to outside identifiers are prohibited. The IRB protocol is ensured by Massachusetts General Hospital. The following statement has been confirmed by Kathryn Bean who oversees IRB approval for Harvard Extension School. Per our email communication she states, “as long as there is an established firewall between you and your ability to re-identify the data you are receiving for your thesis then it would still be considered not human subject research. You may have access to identifiers in your role at MGH, but we are more focused on if

you have access to identify participants in the data you are using for your own research.”

All data used in this study was deidentified.

### Data Analysis

Aim 1 utilized “RStudio” statistical software, version 2023.06.0+421 for all analyses. Aim 2 used SPSS, version 28.0.0.0 (190) for all analyses. Unpaired t-tests compared the means of majority (non-Hispanic White) and minority (Black and Hispanic/Latina) groups on birth outcomes. A series of regression models were used to examine the association between racial and ethnic affiliation, depression, anxiety, and CB-PTSD while controlling for known contributors of maternal psychopathology. Correlation models were used to assess the relationship between perceived experiences of discrimination and maternal psychopathology. Confidence levels of  $p < 0.05$  were considered to be significant.

## Chapter III.

### Results

In this chapter, we will explore the descriptive statistics and main findings obtained through data analysis of aims 1 and 2.

#### Aim 1 Descriptive Statistics

Table 1 provides the descriptive statistics for all variables included in the analysis. Aim 1 consisted of 4,425 women who participated in the study with a mean age of 31.7 years. All the women in the study had given birth within the last 6 months. Of the 4,425 women, 523 were Black and Hispanic/Latina and 3,902 were non-Hispanic White.

Table 1. Demographic Features of Aim 1

|                                   | MINORITY     | NON-HISPANIC WHITE | TOTAL        |
|-----------------------------------|--------------|--------------------|--------------|
| Race (N, %)                       | 523 (9.94)   | 3902 (74.2)        | 4,425        |
| Age (mean, range)                 | 30.8 (18-49) | 31.9 (18-56)       | 31.7 (18-56) |
| Gender (N, %)                     |              |                    |              |
| Female                            | 89 (17.0)    | 993 (25.4)         | 1,082 (24.4) |
| Transgender                       | 0 (0.0)      | 1 (0.02)           | 1 (0.02)     |
| Genderqueer/Gender Non-Conforming | 1 (0.1)      | 1 (0.02)           | 2 (0.04)     |
| Income (N, %)                     |              |                    |              |
| Less than \$20,000                | 63 (12.0)    | 121 (3.10)         | 184 (4.16)   |
| \$20,000-\$99,999                 | 275 (52.5)   | 1663 (42.6)        | 1938 (43.8)  |
| \$100,000-\$300,000               | 163 (31.1)   | 1906 (48.8)        | 2,069 (46.8) |
| More than \$300,000               | 18 (3.44)    | 181 (4.63)         | 199 (4.50)   |
| Marital Status (N, %)             |              |                    |              |
| Married                           | 411 (78.5)   | 3613 (92.5)        | 4024 (90.9)  |

Table 1. Demographic Features of Aim 1

|  |            |             |             |
|--|------------|-------------|-------------|
| Single   | 106 (20.2) | 271 (6.94)  | 377 (8.52)  |
| Divorced, Separated, or Widowed                                | 5 (0.95)   | 18 (0.46)   | 23 (0.52)   |
| Mode of Delivery (N, %)  |            |             |             |
| Natural (i.e., no use of anesthetics)                          | 62 (11.8)  | 553 (14.1)  | 615 (13.9)  |
| Vaginal  | 178 (34.0) | 1451 (37.1) | 1629 (36.8) |
| Assisted (e.g., instrumental, vacuum extractor, forceps, etc.) | 30 (5.73)  | 395 (10.1)  | 425 (9.60)  |
| C-Section  | 51 (9.75)  | 382 (9.78)  | 433 (9.79)  |
| Unplanned /Emergency C-section                                 | 120 (22.9) | 659 (16.8)  | 779 (17.6)  |
| Childbirth Complication (N, %)                                 |            |             |             |
| Yes  | 98 (18.7)  | 982 (25.1)  | 1080 (24.4) |
| No   | 342 (65.3) | 2453 (62.8) | 2795 (63.2) |
| Trauma History (N, %)  |            |             |             |
| Yes  | 160 (30.5) | 1600 (41.0) | 1760 (39.8) |
| No   | 363 (69.4) | 2302 (58.9) | 2665 (60.2) |
| NICU Admission (N, %)  |            |             |             |
| Yes  | 58 (11.0)  | 445 (11.4)  | 503 (11.4)  |
| No   | 382 (73.0) | 2981 (76.3) | 3363 (76.0) |

*Demographic features by racial group (N, %). The table includes data from 4,425 participants. The demographic features include maternal age, gender, marital status, income level, mode of childbirth delivery, trauma history, any complications during childbirth, and (NICU) admission.*

#### Aim 1 Main Analysis

A series of independent sample t-tests were employed to assess depression, anxiety, CB-PTSD, and PDI scores (Figures 4-7) between minority women and non-Hispanic White women, and prevalence rates were estimated as well (Figures 1-3 and Table 2).



The prevalence of minority women meeting clinical symptoms of postpartum depression (measured on the BSI) was 31.2% ( $N = 54$ ) compared to 21.0% ( $N = 384$ ) for non-Hispanic White women (Figure 1). Similar rates were found for anxiety symptoms among the minority women (26.7%,  $N = 45$ ) and non-Hispanic White women (17.1%,  $N = 319$ ; Figure 2). Additionally, minority women (16.8%,  $N = 51$ ) meeting PTSD symptoms at a clinical level following childbirth (as measured by PCL-5), exceeded the prevalence observed in non-Hispanic White women (11.5%,  $N = 310$ ; Figure 3).

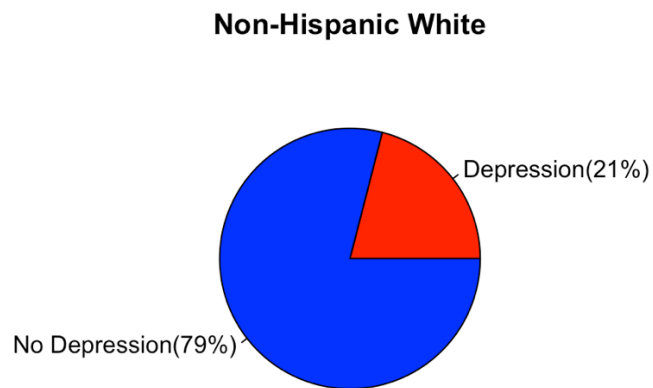
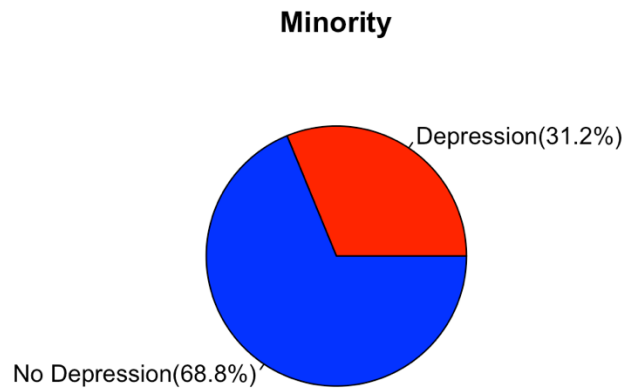


Figure 1. Prevalence of Depression Symptoms by Race and Ethnicity

*Note. This figure depicts pie charts with percentages of postpartum depression symptoms by racial and ethnic group. Depression was defined based on score on the Brief Symptom Inventory (BSI ( $\geq 9$ )). Black and Hispanic/Latina  $N = 54$ , non-Hispanic White  $N = 384$ .*

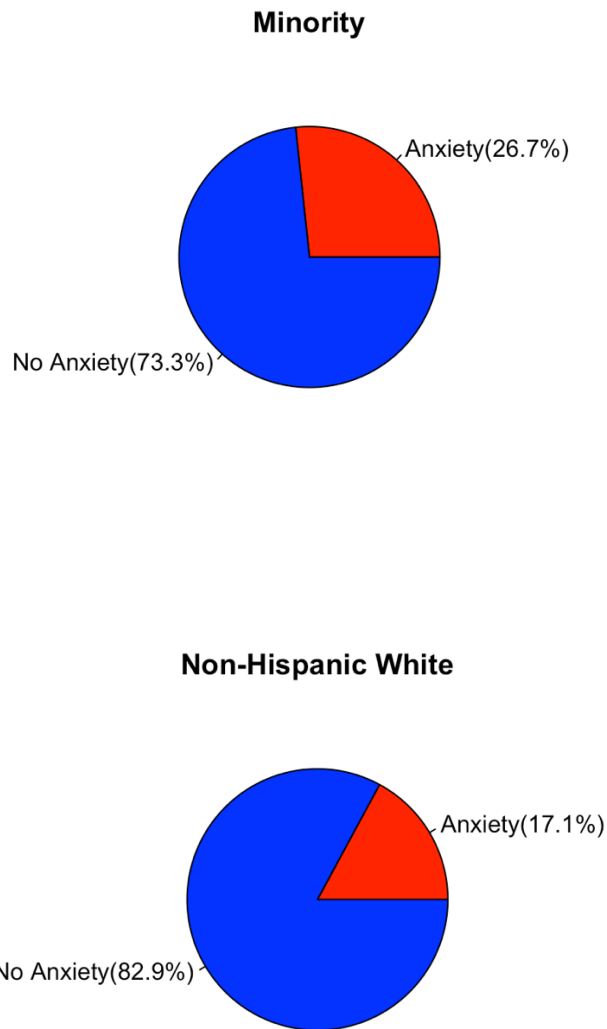


Figure 2. Prevalence of Anxiety Symptoms by Race and Ethnicity

*Note. This figure depicts pie charts with percentages of postpartum anxiety symptoms by racial and ethnic group. Anxiety was defined based on score on the Brief Symptom Inventory (BSI  $\geq 9$ ). Black and Hispanic/Latina  $N = 45$ , non-Hispanic White  $N = 319$ .*

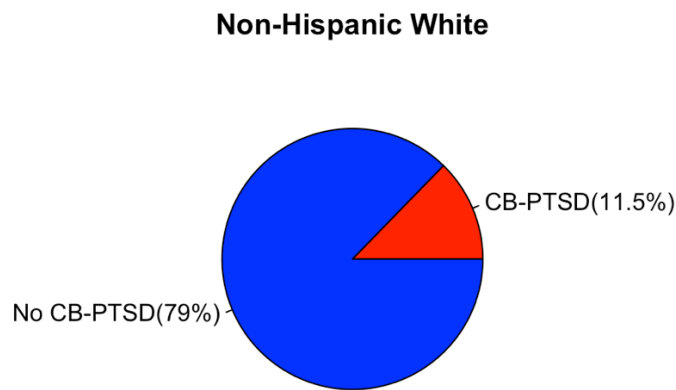
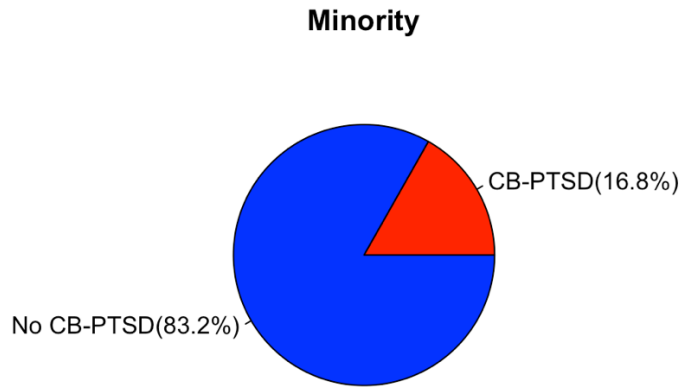


Figure 3. Prevalence of Clinical CB-PTSD Symptoms by Race and Ethnicity

*Note. This figure depicts pie charts with percentages of postpartum CB-PTSD symptoms by racial and ethnic group. CB-PTSD was defined based on score on the post-traumatic checklist for DSM-5 (PCL-5 ( $\geq 32$ )). Black and Hispanic/Latina  $N = 51$ , non-Hispanic White  $N = 310$ .*

Statistical analysis to evaluate symptom severity of depression, anxiety, and CB-PTSD all revealed significant differences between racial and ethnic groups. Minority

women had significantly higher clinical symptom severity scores (measured on the BSI) for depression ( $M = 6.20$ ) and anxiety ( $M = 5.50$ ) than non-Hispanic White women ( $M = 4.84$ ) ( $M = 4.12$ ), respectively,  $t(2044) = 3.13, p < 0.001, t(2033) = 3.45, p < 0.001$  (Figures 4-5). Cohen's  $d$  calculated a small effect size for depression (0.25) and anxiety (0.27). ANOVA revealed race significantly influences depression scores,  $F(1, 2044) = 9.83, p = 0.002$  and anxiety scores  $F(1, 2033) = 11.9, p = 0.002$ . Partial eta-squared values of 0.005 for depression, and 0.006 for anxiety, indicate a small proportion of the variance is explained by race.

The PDI, which assesses acute stress response following childbirth showed significant differences in the mean scores between the Black and Hispanic/Latina women ( $M = 13.0$ ) and the non-Hispanic White women ( $M = 11.1$ ),  $t(3421) = 3.37, p < 0.001$  (Figure 6). Cohen's  $d$  showed a small of effect size of 0.19. Mean differences in CB-PTSD scores (measured on PCL-5) indicate clinical symptoms of PTSD following childbirth were higher among minority women ( $M = 16.6$ ) compared to non-Hispanic White women ( $M = 13.7$ ),  $t(2999) = 3.30, p < 0.001$  (Figure 7). The effect size of 0.20 (measured by Cohen's  $d$ ), indicated a small effect. ANOVA results were significant,  $F(1, 2999) = 10.87, p < 0.001$ , with a partial eta-squared value of 0.003.

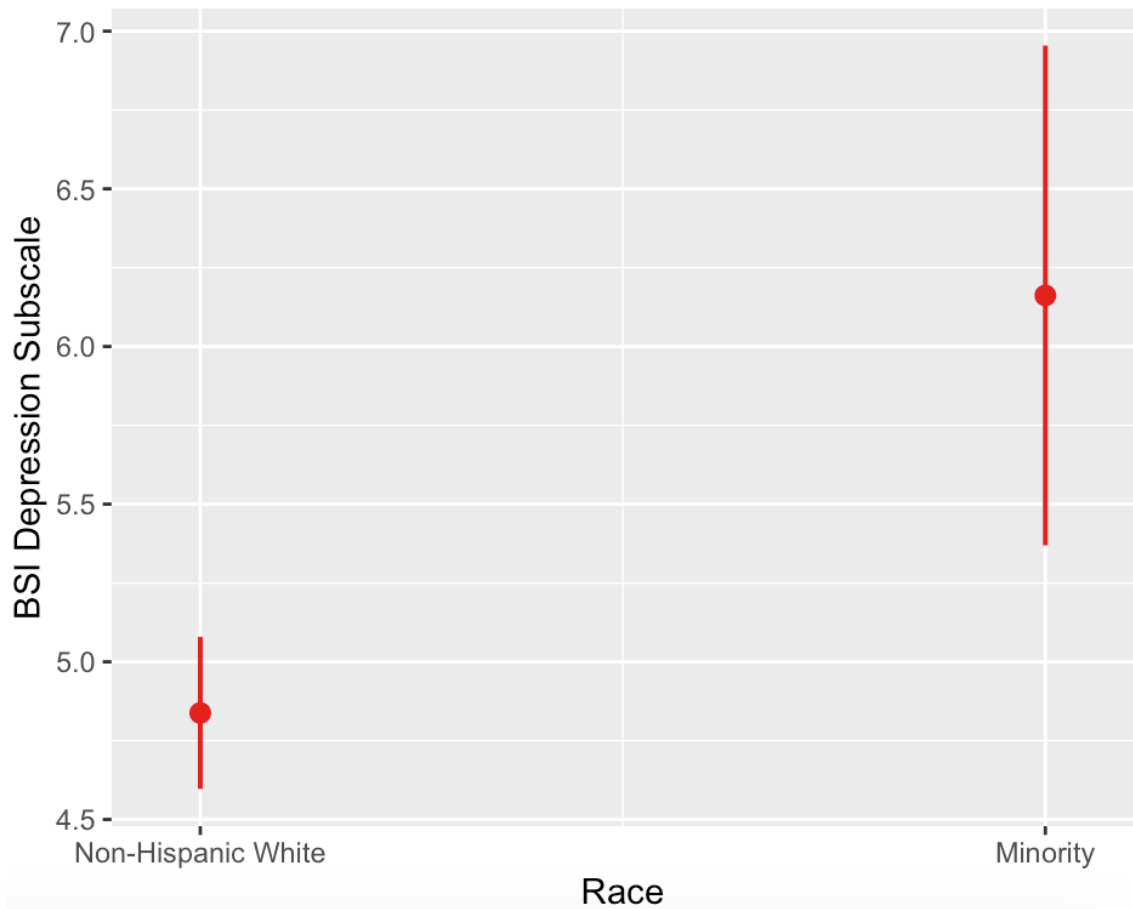


Figure 4. Depression Symptom Severity Scores by Race and Ethnicity

*Note. The figure depicts a predictor plot with the mean depression scores and standard deviations measured on the BSI depression subscale by racial and ethnic group.*

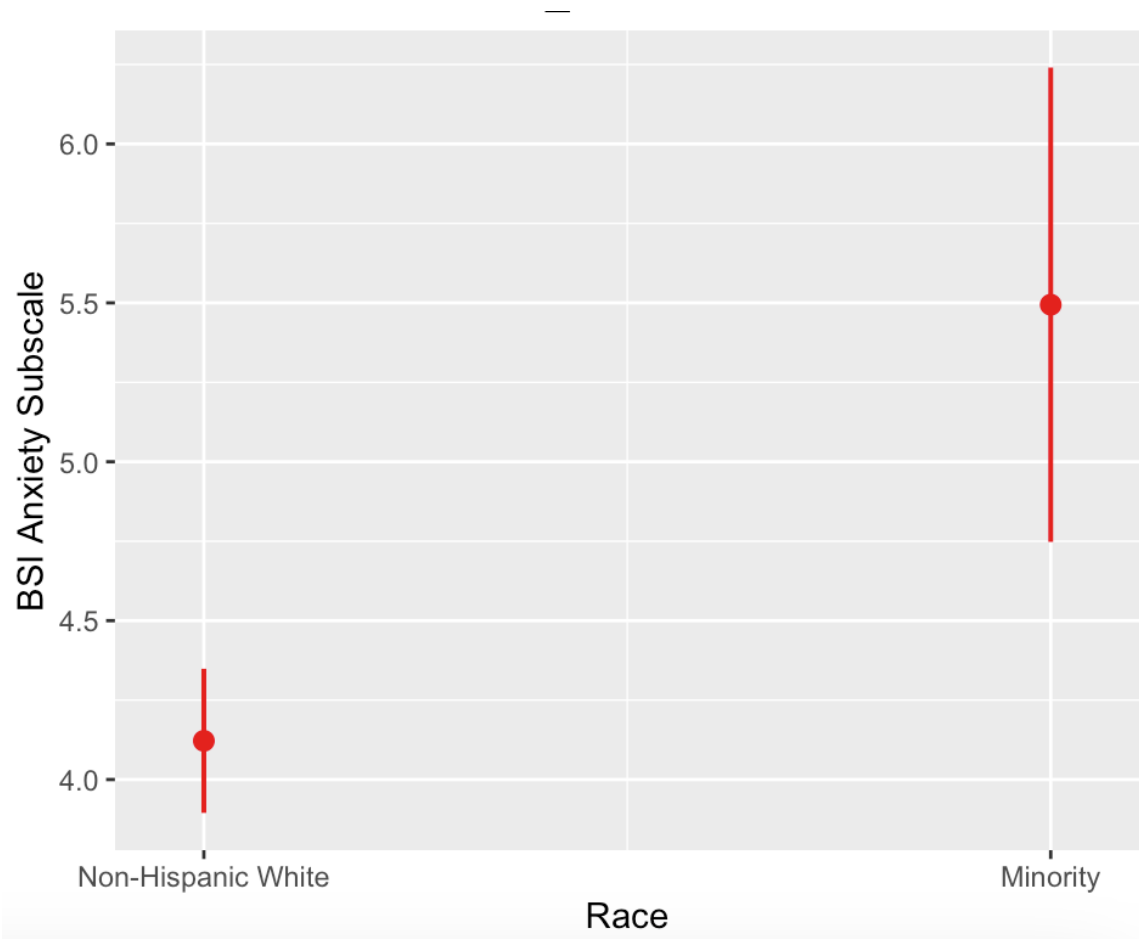


Figure 5. Anxiety Symptom Severity Scores by Race and Ethnicity

*Note. The figure depicts a predictor plot with the mean anxiety scores and standard deviations measured on the BSI anxiety subscale by racial and ethnic group.*

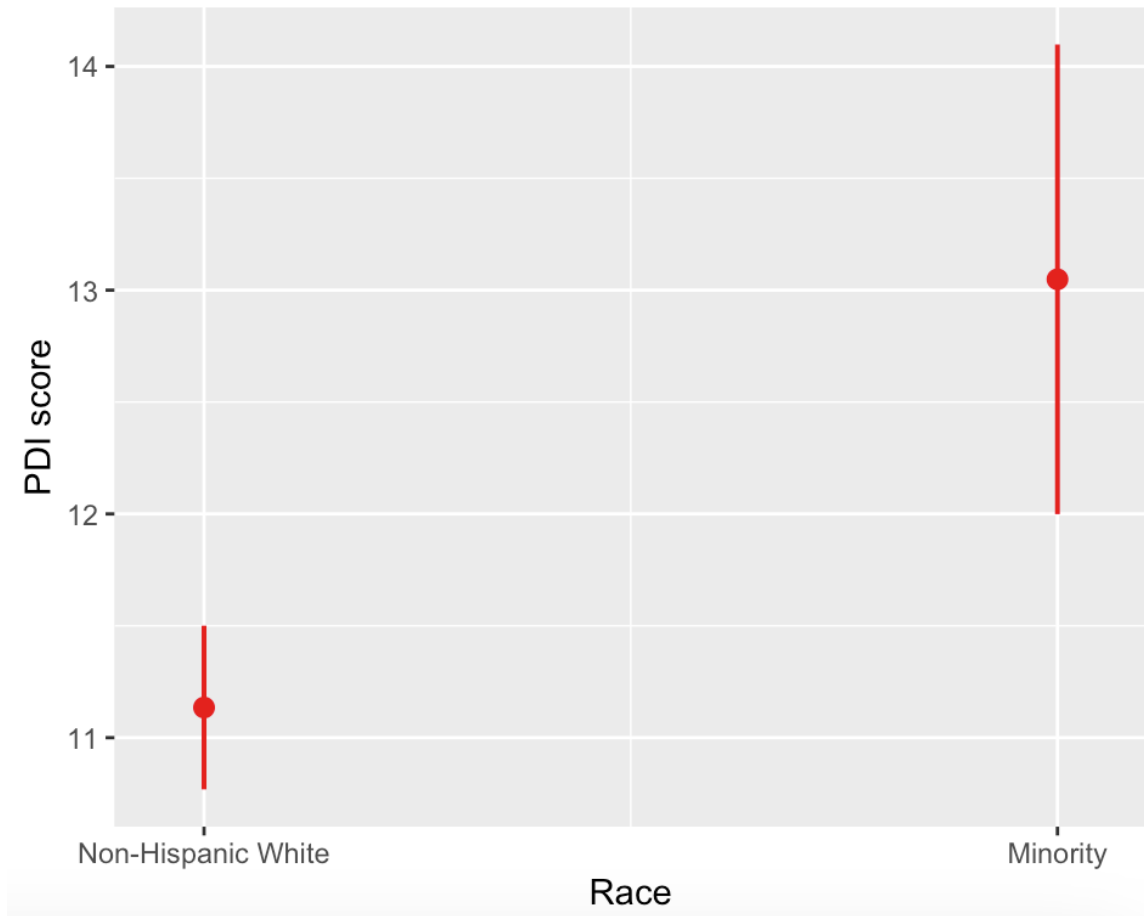


Figure 6. Mean PDI Scores by Race and Ethnicity

*Note. The figure depicts a predictor plot with the mean PDI scores and standard deviations measure on the Peritraumatic Distress Inventory by racial and ethnic group.*



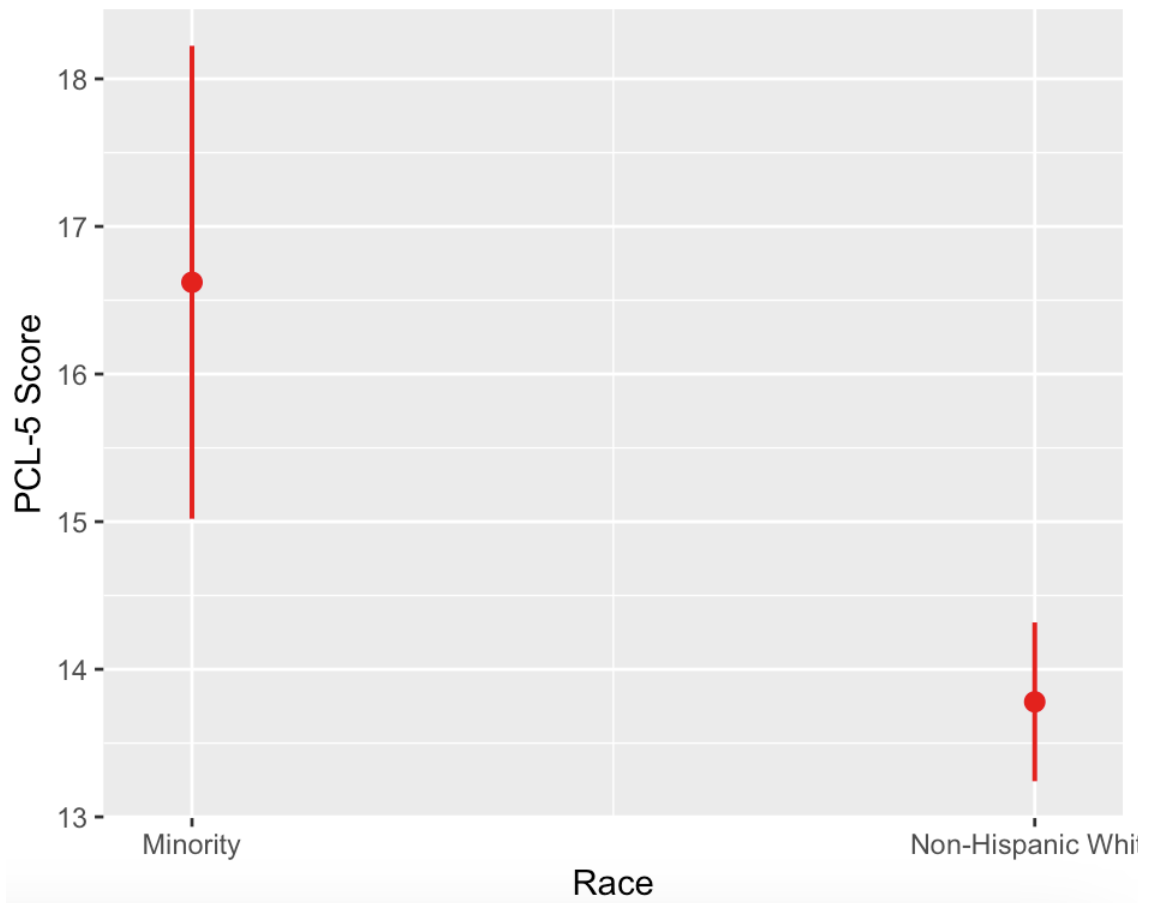


Figure 7. CB-PTSD Symptom Severity Scores by Race and Ethnicity

*Note. The figure depicts a predictor plot with the mean CB-PTSD scores and standard deviations measure on the PCL-5 by racial and ethnic group.*

#### Differences in Clinical Symptom Endorsement Rates by Race and Ethnicity

Statistical analysis to examine differences in the rates of endorsement of clinical symptoms by race and ethnicity reveal the same pattern of results. Pearson's Chi-Squared Tests of Independence were performed to analyze differences in symptom prevalence for anxiety, depression, and CB-PTSD, by racial and ethnic affiliation. Additionally, odds ratio (OR) values were calculated to determine the likelihood of these mental health outcomes between racial groups.

All chi-squared tests were significant. Significant associations were found between minority women and clinical symptoms of postpartum depression,  $X^2 (1, N = 438) = 10.8, p < 0.001$ ) as well as symptoms of postpartum anxiety,  $X^2 (1, N = 365) = 9.90, p = 0.002$ ), on the BSI subscales (Table 2). Specifically, minority women were two times more likely to have depression and anxiety than those who were non-Hispanic White, (OR = 1.80, 95% CI: 1.30, 2.50) (OR = 1.80, 95% CI: 1.23, 2.53), respectively (Table 2). Chi-Squared results of the PDI show minority women were at an increased risk of experiencing PTSD postpartum compared to non-Hispanic White women  $X^2 (1, N = 866) = 6.50, p = 0.01$ ). Furthermore, minority women were more likely to meet clinical levels of CB-PTSD,  $X^2 (1, N = 361) = 7.20, p = 0.01$ ; Table 2) and almost twice as likely to experience CB-PTSD than non-Hispanic White women (OR = 1.60, 95% CI: 1.12, 2.14) (Table 2).

Table 2. Mental Health Outcomes by Race and Ethnicity

|                 | MINORITY  | NON-HISPANIC WHITE | $X^2$   | OR (95%, CI)      |
|-----------------|-----------|--------------------|---------|-------------------|
| Disorder (N, %) |           |                    |         |                   |
| Depression      | 54 (31.2) | 384 (21.0)         | 10.8*** | 1.80 (1.20, 2.50) |
| Anxiety         | 46 (26.7) | 319 (17.1)         | 9.90**  | 1.80 (1.23, 2.53) |
| CB-PTSD         | 51 (16.8) | 310 (11.5)         | 7.20**  | 1.60 (1.12, .14)  |

*This table depicts differences by study group in the percentage of postpartum mental health outcomes. Anxiety and depression were defined based on clinical cutoff score on the Brief Symptom Inventory (BSI ( $\geq 9$ )). CB-PTSD were defined based on clinical cutoff scores on the Post-traumatic Checklist for DSM-5 (PCL-5 ( $\geq 32$ )).*

*$X^2$  Pearson's Chi-Squared, OR odd ratios, 95% CI 95% confidence interval*

*\*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ .*

## Controlling for Risk Factors: Examining Race and Ethnicity as a Predictor of Maternal Psychopathology

We further conducted an Analysis of Covariance (ANCOVA) to examine the relationship between anxiety, depression, CB-PTSD and race and ethnicity. Important factors that are strong contributors of maternal psychopathology and have been shown to be associated with a person's racial and ethnic affiliation were accounted for. The covariates of interest were maternal age, marital status, income level, mode of childbirth delivery, trauma history, any complications during childbirth, and NICU admission. The appendix displays figures of these results (Figures 12-14).

An ANCOVA examining whether minority women have higher levels of depression than the non-Hispanic White group, controlling for the chosen covariates, revealed significant results,  $F(8, 1972) = 24.1, p < 0.001$  (Figure 9). A similar ANCOVA examining the effect of race and ethnicity on anxiety while controlling for the covariates of interest was significant,  $F(8, 1962) = 16.5, p < 0.001$  (Figure 8). Finally, race and/or ethnicity was a significant predictor of CB-PTSD while controlling for the covariates of interest,  $F(8, 2880) = 66.6, p < 0.001$  (Figure 10).

## Analysis of Perceived Discrimination and Maternal Mental Health by Race and Ethnicity

Aim 2 consisted of 28 women who were no more than 3 months postpartum. Of the women, 5 were Black and Hispanic/Latina and 23 were non-Hispanic White.

## Aim 2 Main Analysis

A series of t-tests and correlations were conducted to analyze PDS scores across racial and ethnic groups. Each participant was asked to fill out the 9-item PDS based on their lifetime perceived experiences of discrimination and three additional questions about discrimination in peripartum or obstetric (OB) care. The PDS scores were then assessed for associations between symptoms of depression, general distress, and clinical CB-PTSD among minority women.

The results of the independent t-test showed minority women had significantly different PDS scores ( $M = 25.4$ ) than non-Hispanic White women, ( $M = 34.9$ ),  $t(26) = 5.69$ ,  $p < 0.001$ . Minority women, on average, scored lower on the PDS indicating more lifetime perceived experiences of discrimination. Similarly, minority women experienced more OB discrimination ( $M = 8.25$ ) than non-Hispanic White women ( $M = 3.26$ ),  $t(25) = 4.57$ ,  $p < 0.001$ .

We further conducted a Pearson's correlation to investigate the strength of the relationships between the PDS and clinical symptoms of depression (measured on EPDS), general distress (measured on BSI), and clinical CB-PTSD (measured on PCL-5) scores among minority women. Depression and PDS scores had a positive correlation, but were not statistically significant,  $r(28) = .25$ ,  $p = .21$ . Alternatively, OB discrimination and depression scores were moderately correlated and statistically significant,  $r(27) = .43$ ,  $p = .03$ . Similar patterns of results were found with general distress and PDS scores,  $r(28) = .31$ ,  $p = .11$  and OB discrimination results,  $r(27) = .63$ ,  $p < .001$ . Among CB-PTSD scores, we see more significant trends with the PDS,  $r(27) = .44$ ,  $p = .02$  and OB discrimination,  $r(26) = .50$ ,  $p = .01$ .

## Chapter IV.

### Discussion

There is a critical gap in the literature of the impact of racial and ethnic status and racial discrimination on maternal psychopathology following childbirth. To address this, in aim 1 and 2 we reviewed data collected on women who were Black, Hispanic or Latina, and non-Hispanic White racial and ethnic background. We demonstrate that there are racial and ethnic disparities in psychiatric health among American women. Postpartum Black and Hispanic/Latina women are around two times more likely to suffer from symptoms of postpartum depression and anxiety and had higher odds of experiencing symptoms of clinical CB-PTSD. Our findings suggest that these disparities are not attributed to income, marital status or other important background factors that increase a person's risk to develop a mental illness; nor are explained by obstetrical stressors (e.g., complications and unplanned interventions). Furthermore, we saw positive and significant correlations between OB discrimination, depression, general distress, and CB-PTSD scores. Perceived discrimination in perinatal care may be a contributing factor to traumatic stress responses following childbirth in this sample.

As hypothesized, aim 1 revealed clinical symptoms of postpartum depression, anxiety, and clinical levels of CB-PTSD were more prevalent among minority women than non-Hispanic White women. Minority postpartum women were two times more likely to have symptoms of depression and anxiety and higher odds of clinical CB-PTSD symptoms than non-Hispanic White women, consistent with prior research (Doe et al., 2017; Howell et al., 2005; Lucero et al., 2012; Ramos-Marcuse et al., 2010; Thomas et

al., 2021). Symptom severity of depression, anxiety, and CB-PTSD all revealed significant differences between racial and ethnic groups. We included an analysis of the PDI in our study and we saw that minority women were more likely to have acute postpartum PTSD responses following childbirth.

To better capture the association between race and ethnicity and maternal psychopathology, we controlled for the influence of known predictors of maternal psychopathology. These predictors included maternal age, income, marital status, and trauma history and factors related to childbirth (i.e., complications of childbirth, mode of birth delivery, and infant NICU admission). In this analysis, we were able to confirm our hypothesis that race and ethnicity were significant predictors of depression, anxiety, and CB-PTSD. This could indicate possible long-term implications of race and ethnicity on maternal mental health.

Aim 2 explored the relatively unknown relationship between perceived discrimination and maternal mental health. As expected, minority women experienced more lifetime perceived discrimination (measured on the PDS) compared to non-Hispanic White women. The OB discrimination questions had a small sample of minority women ( $N = 4$ ), nevertheless, the results indicated more peripartum discrimination among minority women. Since the data is actively being collected for this study, the hope is to recruit a larger cohort of minority women for this analysis.

Given the significant results from the PDS, we hypothesized minority women would experience more negative maternal mental health outcomes due to their experiences of perceived discrimination. The minority women had more experiences of perceived discrimination associated with subsequent levels of depression, general

distress, and CB-PTSD, thus confirming our hypothesis. The results of the PDS and depression and anxiety symptoms were moderately correlated but not highly significant. We saw more significant results with the PDS and symptoms of CB-PTSD. These results are consistent with prior research regarding discrimination and maternal mental health (Njoroge et al., 2022; Segre et al., 2021; Weeks et al., 2022). Surprisingly, we saw positive and significant correlations between OB discrimination, depression, general distress, and CB-PTSD levels. A noteworthy observation is that perceived discrimination in peripartum care is a contributing factor to traumatic stress responses following childbirth in this sample.

One of the only studies assessing PTSD diagnostic status and perceived discrimination found that Black and Hispanic/Latina/o adults were at much higher risk for PTSD when exposed to more experiences of perceived discrimination (Sibrava et al., 2019). While causality cannot be confirmed, the Black sample had an extremely high frequency (up to 56.3%) of exposure to perceived discrimination. We know experiences of racial discrimination can have long-term negative consequences on mental health in the general population of minoritized adults (Breslau et al., 2005; Clark et al., 1999; Schulz et al., 2006; Williams et al., 2003). Additional studies are needed to evaluate these factors across the peripartum with the aim of supporting minoritized women and advancing our understanding of a body of research that remains relatively unexplored.

### Future Directions

The results of this study have practical implications for improving the healthcare of minoritized women. For instance, the findings suggest there needs to be more strict

screening protocols for postpartum mental health disorders particularly among minority women. Our study builds upon existing literature that consistently shows Black and Hispanic/Latina women have a severely high risk for maternal morbidity and mortality (ACOG & SMFM, 2016; Boyd et al., 2020; Callaghan et al., 2012; CDC, 2017; Creanga et al., 2014; Harper et al., 2004; Wang et al., 2021). Moreover, access to care continues to be a critical issue with women of color being disproportionately affected (Ashton et al., 2003; Cook et al., 2014; Manuel, 2018). An average of 22% of mothers who screened positive for depression, without any further intervention utilized mental health care resources (Byatt et al., 2015). When 1-2 additional interventions were offered, mental health care was 2 to 4 times as likely to be utilized (Byatt et al., 2015). Access to perinatal care and maternal mental health education may alleviate women who are negatively impacted (Howell et al., 2012). It is an unfortunate reality that minority women, above all, suffer such severe consequences of childbirth. Implementing these recommendations could potentially lead to improved health and birth outcomes for women and their babies.

While these results of our study are promising in answering a crucial question for minoritized mothers, future research should strive to evaluate larger cohorts of minority women when researching racial discrimination. A small body of research suggest that Black and Hispanic/Latina women experience more peripartum discrimination because of racial stereotypes that providers have of their patients of color, such as sexual history, promiscuity, and single motherhood (Collins, 2000; Rosenthal & Lobel, 2011). Although the research is in its infancy, over time, discrimination is associated with changes in depressive symptoms and overall health outcomes (Schulz et al., 2006). Additionally, it is



known that experiences of discrimination increase during transitional life periods such as puberty (Brody et al., 2006; Greene et al., 2006). Future research would benefit from studying racial and ethnic discrimination across the peripartum which is also considered a major transitional life period (Aktar et al., 2019; Howard et al., 2014). This may answer an important question for mothers who are suffering from racial disparities in healthcare.

### Study Limitations

Despite the valuable findings of this study, limitations are to be expected with any research study. Sample results between Black and Hispanic/Latina women are not consistent and have different levels of risk. For purposes of this study, the minority groups were grouped together because of the limited number of participants. The data being analyzed is mainly from middle upper-class women which could lead to sample bias. Sample bias limits the geographic scope where data is collected and that limits what conclusions can be drawn. Additionally, between the first and second aims of the study we used two different scales for depression (BSI and EPDS). Although these scales measure symptoms versus a possible clinical diagnosis, we see similar trends.

Moreover, this study relied upon self-report measures which can lead to response bias and the possibility of skewed results. Since this is a cross-sectional study with one time point and no clinician diagnostic assessment, we cannot determine causal or temporal relationships. In aim 1, the COVID-19 dataset evaluated women's experiences after the COVID-19 pandemic which was a stressful time for many people. That, in part, could be why we see higher negative mental health outcomes. Lastly, the perceived

discrimination dataset had a very small sample of minority women which can lead to inconsistencies in the sample results.

It is important to note that Black women have a higher risk of negative birth outcomes than Hispanic/Latina and non-Hispanic White women, and research suggests this disparity may be dependent on psychosocial stressors and a woman's nativity (place of birth; Bediako et al., 2015; Montoya-Williams et al., 2021). Foreign-born Hispanic women have positive birth outcomes similar to U.S. born non-Hispanic White women even when their socioeconomic status is worse or similar to the socioeconomic status of Black women (Weden et al., 2017; Velasco-Mondragon et al., 2016). This phenomenon is called the "Hispanic Paradox" and does not apply to U.S. born Hispanic women who have worse birth outcomes. Most research does not take nativity status into account, and it may be important in identifying birth outcomes among Hispanic women. Minority women in the U.S. face unique stressors that relate to racial discrimination and socioeconomic status which could explain why foreign-born Hispanic women have more positive birth outcomes. Nevertheless, Hispanic women on average experience lower adverse birth outcomes compared to Black women, but higher adverse birth outcomes compared to non-Hispanic White women.

## Conclusion

In conclusion, this study advances our understanding of maternal psychopathology by providing evidence for the relationship between maternal mental health and racial and ethnic affiliation. The results of this study provide valuable insight into postpartum mental health outcomes among minoritized women and confirms birth

outcomes seen in existing literature. By controlling for known risk factors of maternal psychopathology, we identified potential reasons why minority women are disproportionately impacted by maternal mental illness. Our hope is the findings from this study advance efforts to eliminate negative birth outcomes for minority women and address the growing body of research on the relationship between racial discrimination and maternal mental health. In bringing awareness to this issue, the need for prioritizing perinatal and postpartum mental health screening for all women is crucial. Future research would benefit from addressing the aforementioned limitations to improve the lives of mothers and their families.

### BSI Depression Subscale By Racial Group

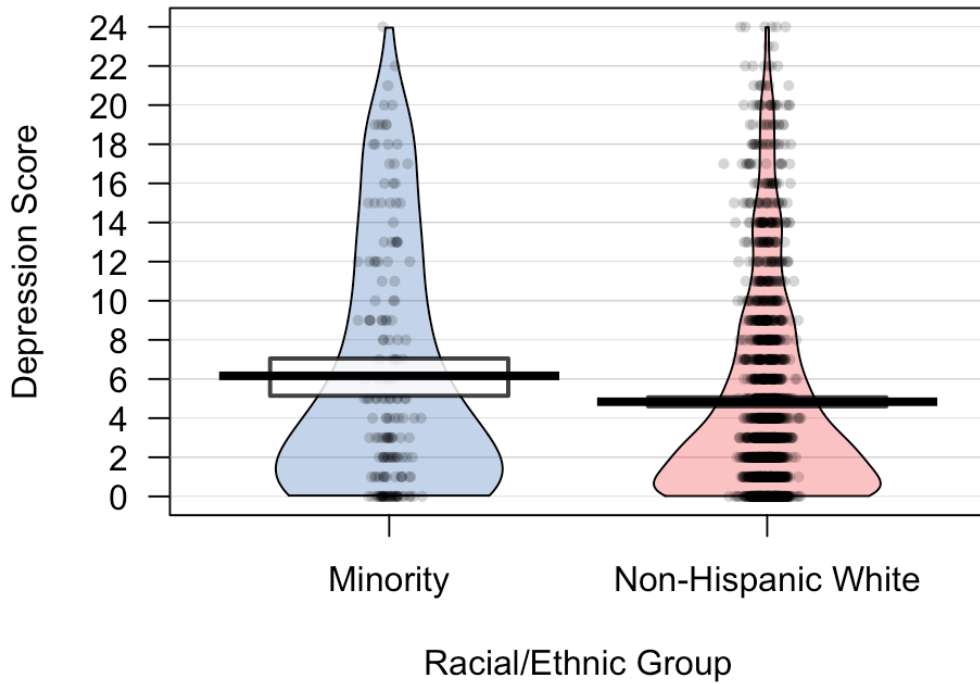


Figure 8. Mean Depression Scores by Race and Ethnicity

*Note. The figure depicts a pirate plot of the mean depression scores and 95% confidence intervals measured on the BSI subscale by racial group.*

## BSI Anxiety Subscale By Racial Group

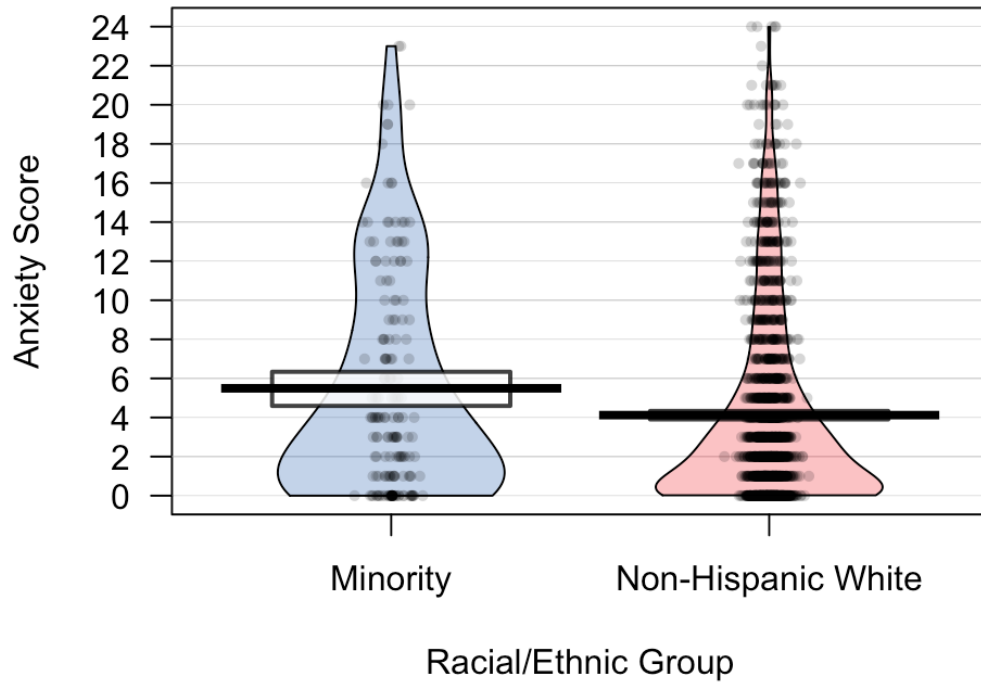


Figure 9. Mean Anxiety Scores by Race and Ethnicity

*Note. The figure depicts a pirate plot of the mean anxiety scores and 95% confidence intervals measured on the BSI subscale by racial group.*

## PDI Score By Racial Group

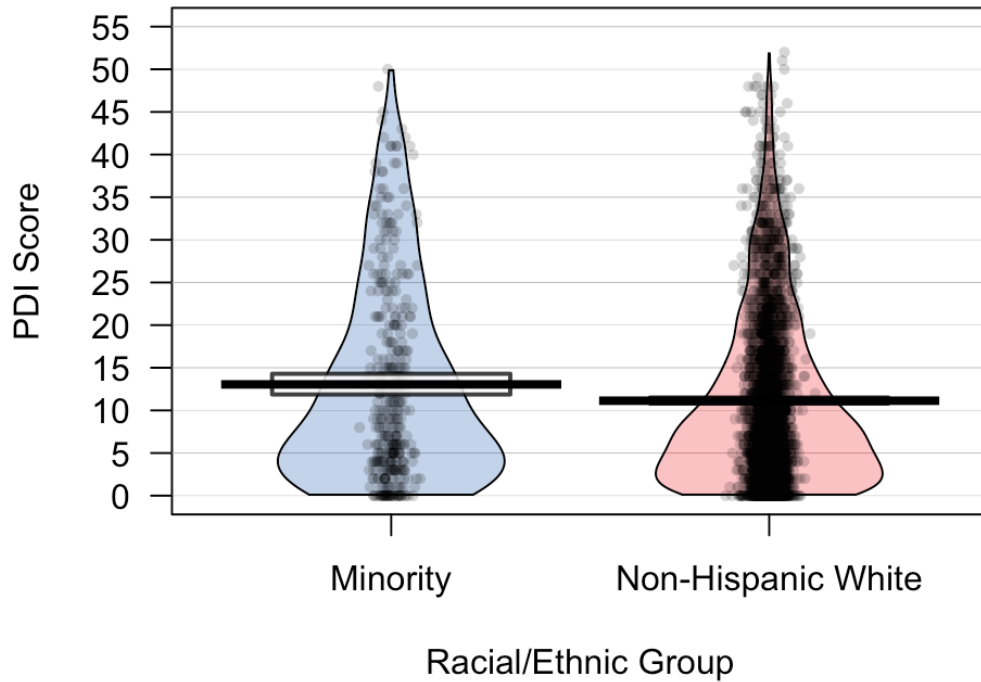


Figure 10. Mean PDI Scores by Race and Ethnicity

*Note. The figure depicts a pirate plot of the mean PDI scores and 95% confidence intervals measured on the Peritraumatic Distress Inventory by racial group.*

## PCL-5 Score By Racial Group

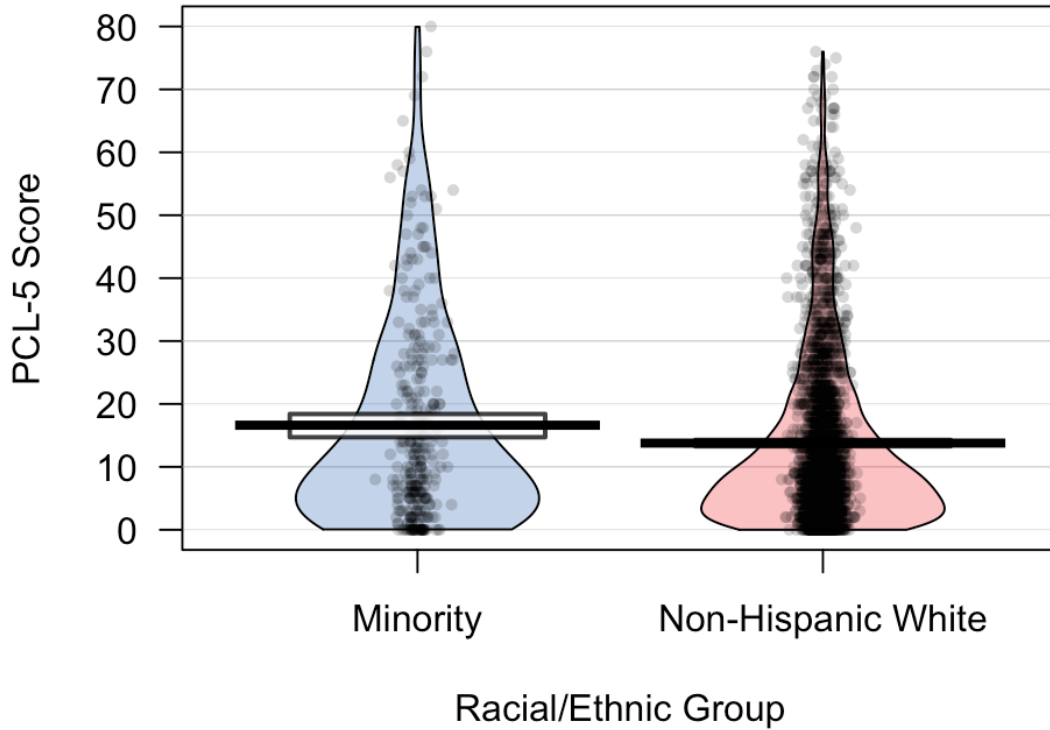


Figure 11. Mean PCL-5 Scores by Race and Ethnicity

*Note. The figure depicts a pirate plot of the mean CB-PTSD scores and 95% confidence intervals measured on the PCL-5 by racial group.*

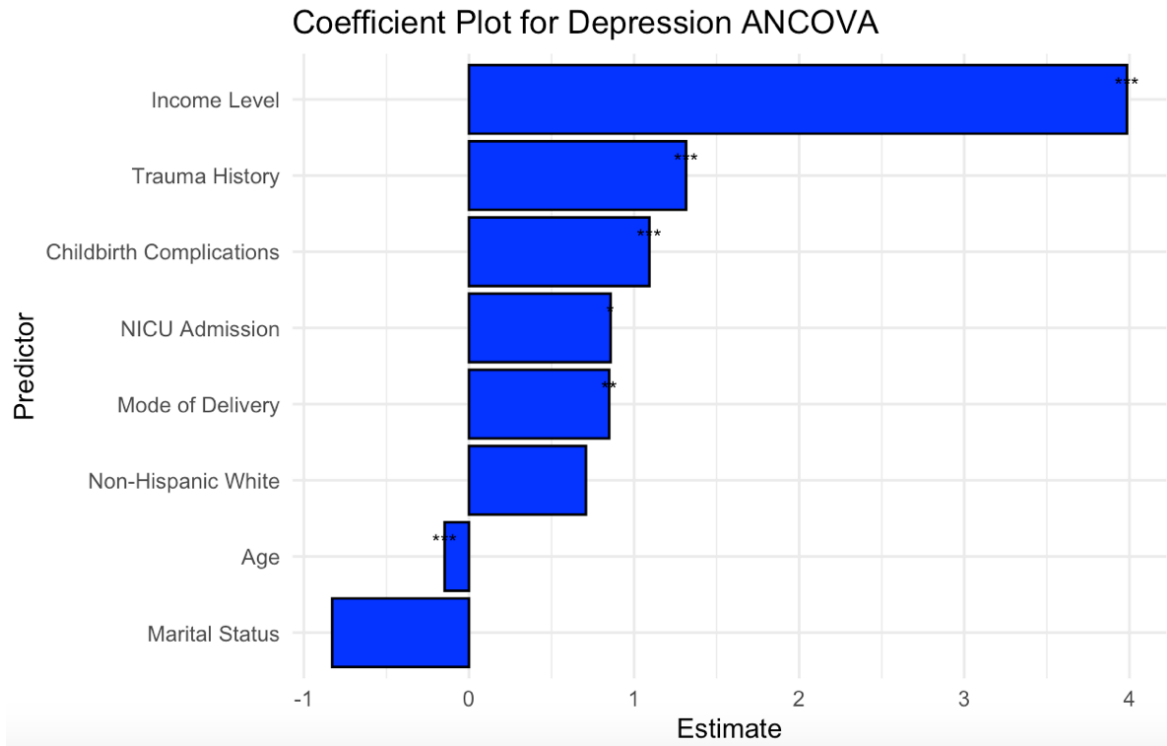


Figure 12. Coefficient Plot for Depression Covariates

*Note. The figure depicts estimate values and the covariates of interest and their impact on depression scores.*



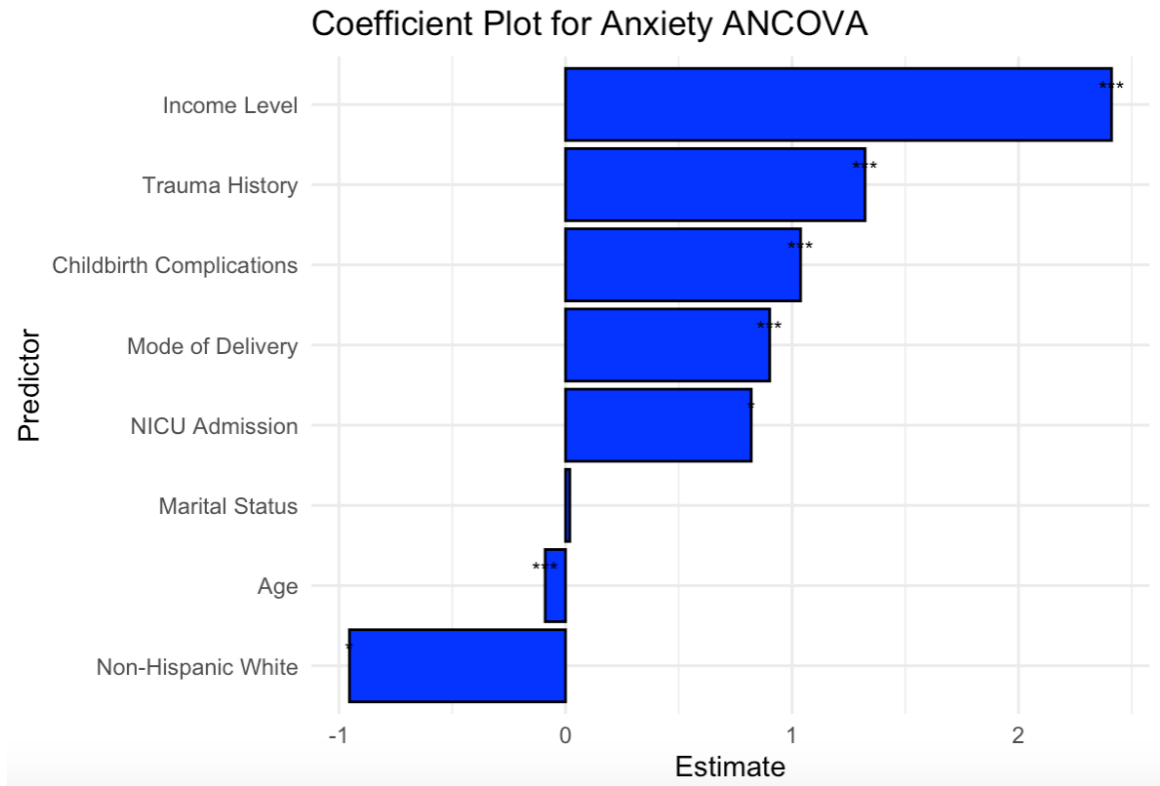


Figure 13. Coefficient Plot for Anxiety Covariates

*Note. The figure depicts estimate values and the covariates of interest and their impact on anxiety scores.*

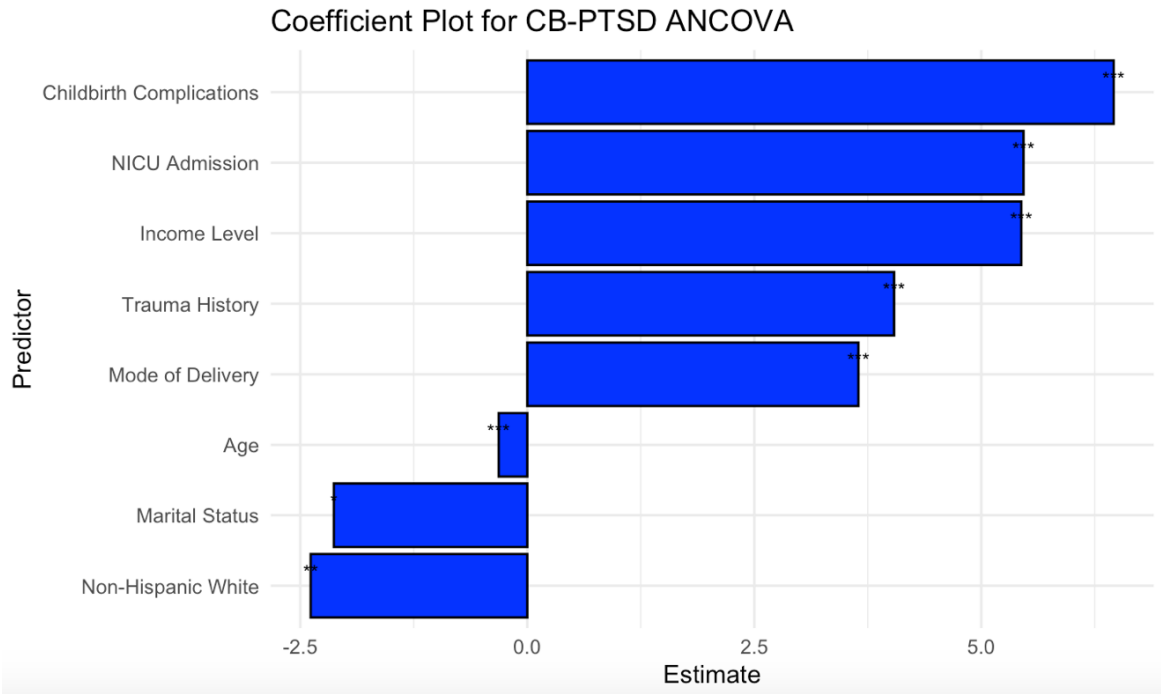


Figure 14. Coefficient Plot for CB-PTSD Covariates

*Note. The figure depicts estimate values and the covariates of interest and their impact on CB-PTSD scores.*

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